REMARKS/ARGUMENTS

Reconsideration and allowance in view of the foregoing amendment and the following remarks are respectfully requested.

Claims 5-7 are now pending.

Applicant hereby re-affirms the election of claims 5-7. Non-elected claims 1-4 have been canceled above to advance prosecution. Applicant reserves the right to file divisional application(s) directed to subject matter not ultimately patented herein.

The Abstract of the Disclosure was objected to because it was longer than 150 words. The original Abstract has been deleted above and a new Abstract has been added which conforms to the size requirement noted by the Examiner. Withdrawal of the objection is solicited.

Original claims 5-7 were rejected under 35 USC §112, second paragraph, as being indefinite.

Regarding claim 5, reference to the electrode layer has been added as suggested by the Examiner. The Examiner also indicated that it was unclear how the average of differences between the radii is used, when the controlling occurs, and whether it is on the same article or a different article. With regard to the average of differences, it is respectfully submitted that claim 5 specified that the average of differences corresponds to the thickness of the protective layer. Claim 5 has been clarified to more specifically refer to "determining" an average of differences between the radiuses as the thickness of the protective layer. With regard to when the controlling occurs, the claim has been rearranged to make clear that the average of differences is determined and then the controlling occurs. With regard to which article protective layer thickness is controlled, as explained in the paragraph bridging pages 19 and 20, in an example embodiment, the protective layer on a subsequent electrode is controlled. As specified in dependent claim 6, the electrode may be the immediately following electrode, but the invention

disclosed is not necessarily limited to an "immediately following" electrode. Nevertheless claim 5 has been revised to make clear that it is a "subsequent" protective layer because, of course, the thickness of the existing protective layer cannot be measured until after a protective layer has been applied so a layer thereafter formed would be a subsequent layer. Presumably the subsequent protective layer could be on the same or a subsequent electrode.

With regard to claim 7, this claim has been amended as suggested by the Examiner to make clear that 180 different points are measured (every 1 degree).

In view of the foregoing, reconsideration and withdrawal of the rejection of claims 5-7 is solicited.

Original claims 5 and 7 were rejected under 35 USC §103(a) as being unpatentable over the admitted state of the prior art in view of JP '214 and GB '572. Applicant respectfully traverses this rejection.

In accordance with a feature of the present invention, a difference between each radius T (measured before spraying) and each radius U (measured after spraying) is calculated, where T means T1,T2,... that are measured at each radius measurement position D1,D2,... and U means U1, U2,... that are measured at each intersection point E1,E2,...(See Figure 9). Each intersection point E (E1,E2,...) are the points of intersection of normals at the radius measurement positions D (D1,D2,...). In this regard, note Figure 8 and Figure 9 in the description of Example 3, at page 28, line 3 – page 30, line 5. See also Figure 4 and the description of Example 1 at page 18, line 22 - page 19, line 3 which shows and describes the basic concept of the invention claimed in claim 5, namely a radius measurement point B intersecting a normal of the radius measurement position A in Figure 4.

An average value of all of the differences is calculated. The average value is considered to be a thickness of the protective layer that covers the surface of the

electrode provided on the surface of the solid electrolyte body of the gas sensor element.

The method of the present invention can measure the radii of the target body before and after the plasma thermal spraying and eliminate variation in the thickness of the protective layer sprayed on the surface of the body. Accordingly, it is possible to correctly evaluate an actual (average) thickness of the protective layer on the body. The method of the present invention can eliminate variation in the profile the body, uneven surface of the body of not negligible size, and uneven surface of the body after spraying. Thus, the method of the present invention can obtain gas sensor elements of an average size.

The method of the present invention can perform the thickness control with micrometer accuracy since the measured value is used as feedback for controlling the supplying amount of the spraying material. The supplying amount of the spraying material can be controlled to $\pm$ 1% accuracy for the thickness control of 100 micrometer accuracy. However, because the measurement accuracy is within $\pm$ 2% accuracy, it is possible to statistically keep the accuracy within $\pm$ 2.3% accuracy in consideration of both variations of the accuracy of the supplying amount of the spraying material (molten protective layer material) and the accuracy of measurement.

The references cited by the Examiner only disclose methods for measuring the thickness and profile of a target, but do not disclose how to increase the measurement accuracy and do not disclose how to perform feedback control, as in the method of the present invention.

Indeed, the references cited by the Examiner do not disclose or suggest the feature of the present invention that the average value of all of the differences between radii U and T measured at corresponding points to each other are used in order to form a (subsequent) protective layer having a desired thickness.

Sonoda JP 2000-282214 discloses a technique in which a distance measuring head 5 measures each distance of a plural points in a thermal spraying base material 6 and 36 (see Fig 7 in JP '214), prior to thermal spraying. A difference between the measured distance and a thickness of a sprayed coating film is calculated after thermal spraying so as to determine a thickness of a thermal spraying material per thermal spraying (one pass). Based on the calculated difference, the number of the sprays (pass number) is determined. Thus, Sonoda discloses only determining the number of sprayings (pass number) based on the determined thickness of a single spraying. Sonoda does not teach or suggest controlling the spraying amount of material to form a protective layer of a desired thickness based on the measured thickness of an already sprayed protective layer.

Kyriakis GB 2138562 discloses a technique in which an average wall thickness of an extrusion object is measured and an overall profile of the extrusion object of an irregular shape is measured. The shape of the passing object is specified based on the measured profile.

In view of the foregoing, it is respectfully submitted that claims 5 and 7 are not anticipated by nor obvious from the admitted prior art taken alone or in combination with JP '214 or GB '562.

Claim 6 was rejected under 35 USC §103 as unpatentable over the admitted prior art in view of JP '214 and GB '562 and further in view of Friese et al. Applicant respectfully traverses this rejection. Claim 6 is submitted to be patentable over the primary combination for the reasons advanced above. The Examiner's further reliance on Friese does not overcome the deficiencies of the primary references noted above. Further in this regard it is noted that Friese discloses a technique in which a transferred layer mass is measured based on a substrate surface temperature measured during a spraying process in order to assume a layer thickness. Friese clearly does not teach the determining or control steps of the invention even if combined with the primary

references, which are themselves deficient with respect to the claimed invention for the reasons advanced above.

Thus, the present invention has the remarkable feature and effect described above and is different in manner and effect from JP '214, GB/562 and US '030 cited by the Examiner. Therefore, even if the disclosures of the cited references could be combined, it would not result in the present invention as claimed.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in condition for allowance and an early Notice to that effect is earnestly solicited.

Respectfully submitted,

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